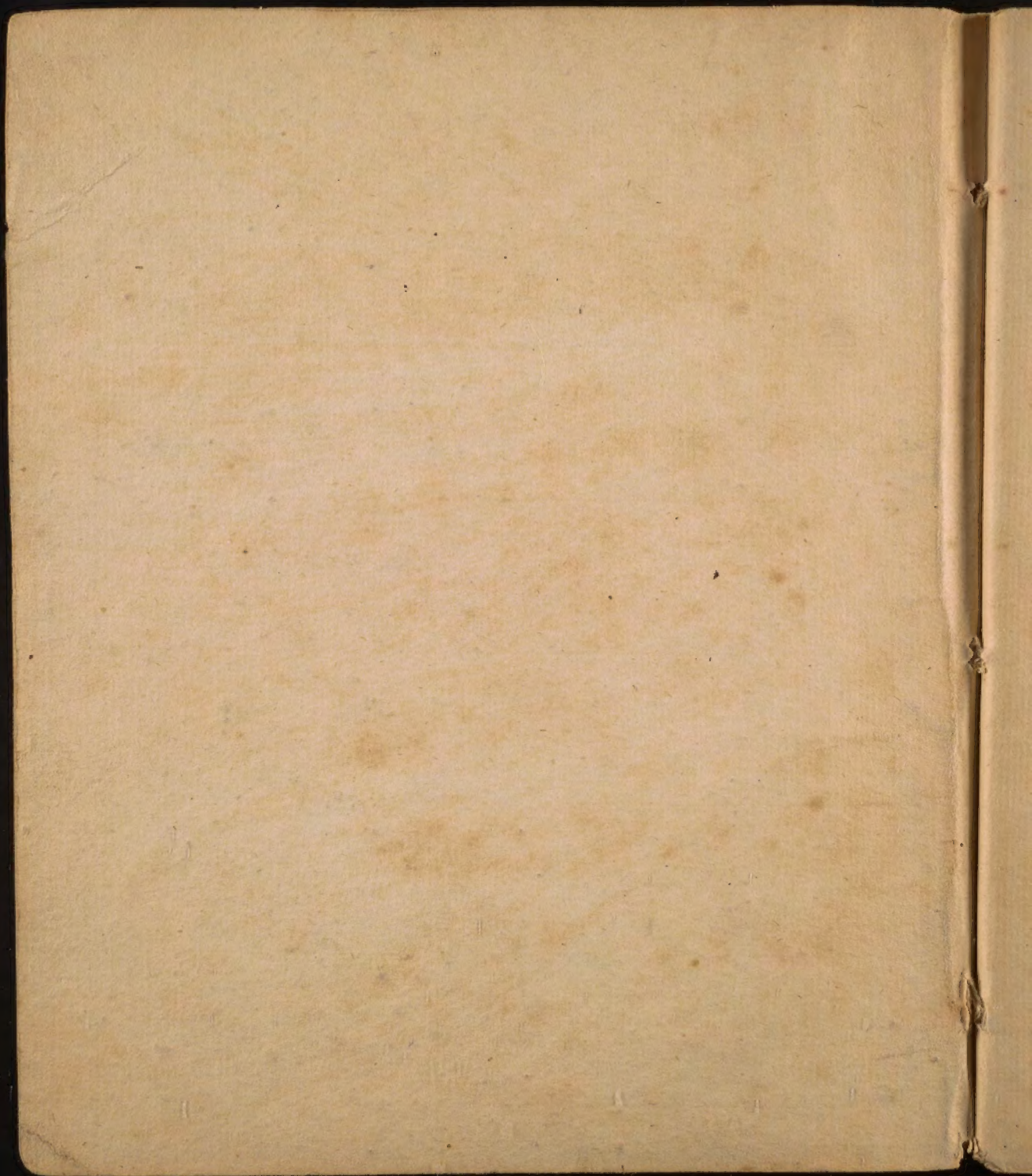


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of Digestion 621.  
of the Chyle — 652.  
of the blood —



V I shall first remark that the  
Stomach is a most important viscus,  
hence it is possessed by all animals.  
It is so full of nerves that it may be com-  
pared to a tendinous expansion of the brain. <sup>the tenia by D. t. g. excepted.</sup> So  
essential are its functions to life, that  
it has said the Soul is seated in it. It is  
certainly the index of the state of the  
system in many diseases. <sup>It possesses</sup>  
<sup>a</sup> <sup>Association in health & sympathy in sickness</sup>  
~~Stomach~~ wonderful connection with  
every part of the body. in health as  
well as sickness - The nerves - and  
blood vessels may even the mind are  
affected by it. <sup>It is one of the waste gates of ex-</sup>  
<sup>-posing impressions.</sup> Hence it should never  
be lost sight of a moment in inquiry  
for investigating, & prescribing for diseases  
of those parts. Many diseases it is said  
enter the body thro' the medium of the



such parts of the mouth as to favour  
the action of the teeth upon it. It after-  
wards protrudes it into the fauces from  
whence it passes by the tonsils - Velum  
palati - & Epiglottis assisted by the action  
of a great number of small muscles  
into the Oesophagus - and from thence  
into the Stomach where it undergoes  
the process of digestion. <sup>Solids</sup> ~~Things~~ more easily  
swallowed than fluids.

### of Digestion.

~~Question~~ In what manner is this  
performed? - The answer to this  
question shall be the business of  
<sup>our</sup> ~~the~~ <sup>ingenuity</sup> ~~present lecture~~ - V

¶ The changes which the food  
undergoes in the Stomach previously



Stomach — still more I believe are  
expelled from the body which act  
primarily, & exclusively upon it. —  
~~But to observe~~ —

It is formed ~~as~~ like the teeth upon the  
compound principles of carnivorous  
& granivorous animals.

Its function is an important one  
in the animal Economy. ~~The~~ <sup>we behold</sup> ~~the~~  
in <sup>it</sup> something like what the alchemists  
have sought for in their crucibles — in  
their attempts to obtain gold from the  
baser metals — a power of changing the  
most dissimilar & heterogeneous matters  
into a ~~more~~ substance which imparts  
nourishment & life to the human  
body. .

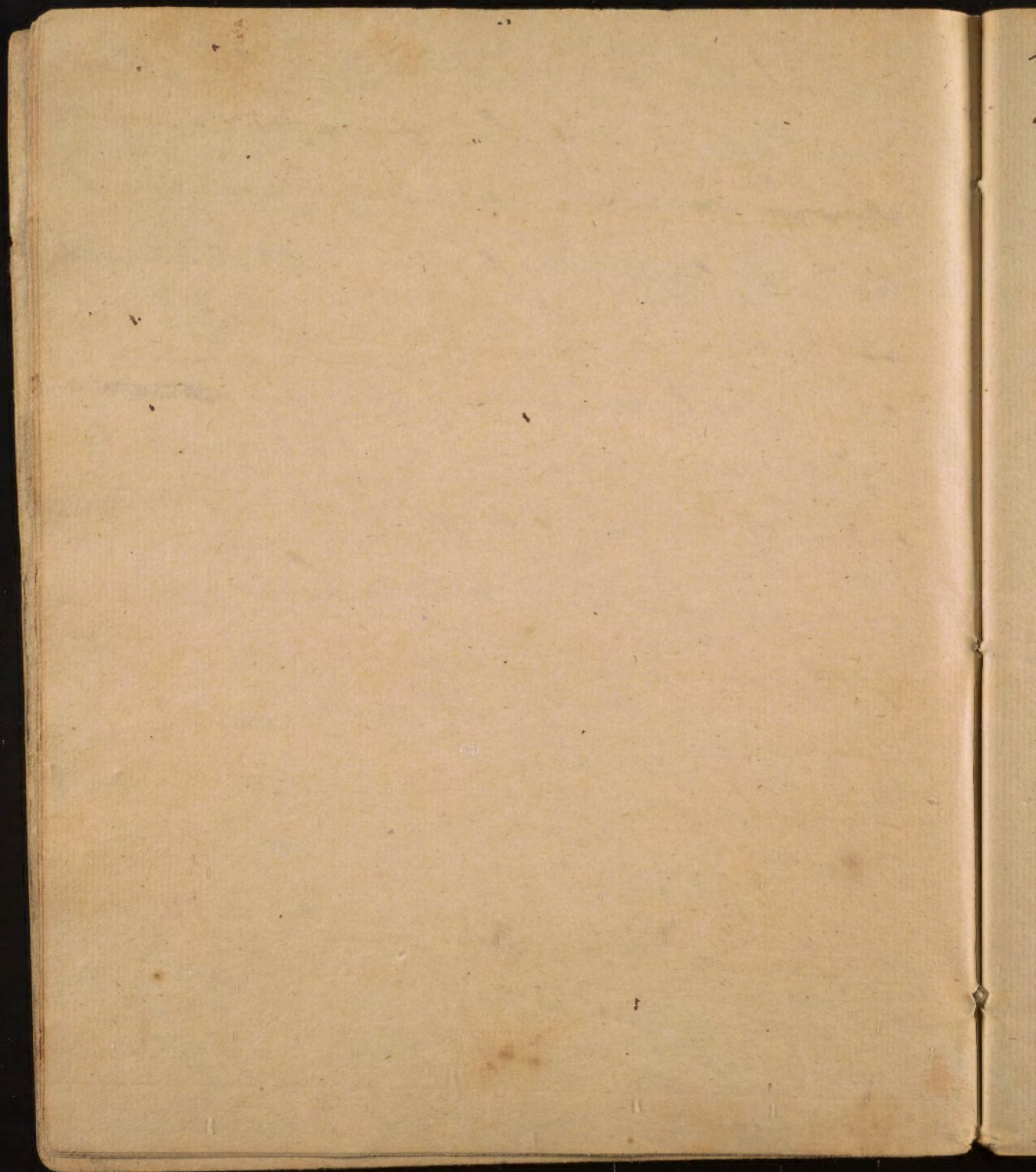


to its living converted into Chyle, has  
 been ascribed to the operation of two  
~~agents~~ agents. These are 1 mechanical  
 and 2 chemical. The mechanical  
~~includes~~ includes Iritation only. The  
 chemical includes <sup>putrefaction</sup> - heat - ~~putrefaction~~  
 - Solution - and fermentation. of  
 each of which I shall treat in order.

Much was ascribed to Iritation  
 by the mechanical physicians. Pit-  
 -cairer has computed the force of the  
<sup>employed in digestion</sup>  
 Stomach, to be equal to 12,951 pounds.

Dr Boerhaave has enumerated all the  
 forces which are ~~supposed~~ supposed to act in  
 digestion - These are the muscular action  
 of the Stomach - the action of the  
 Diaphragm in respiration - and





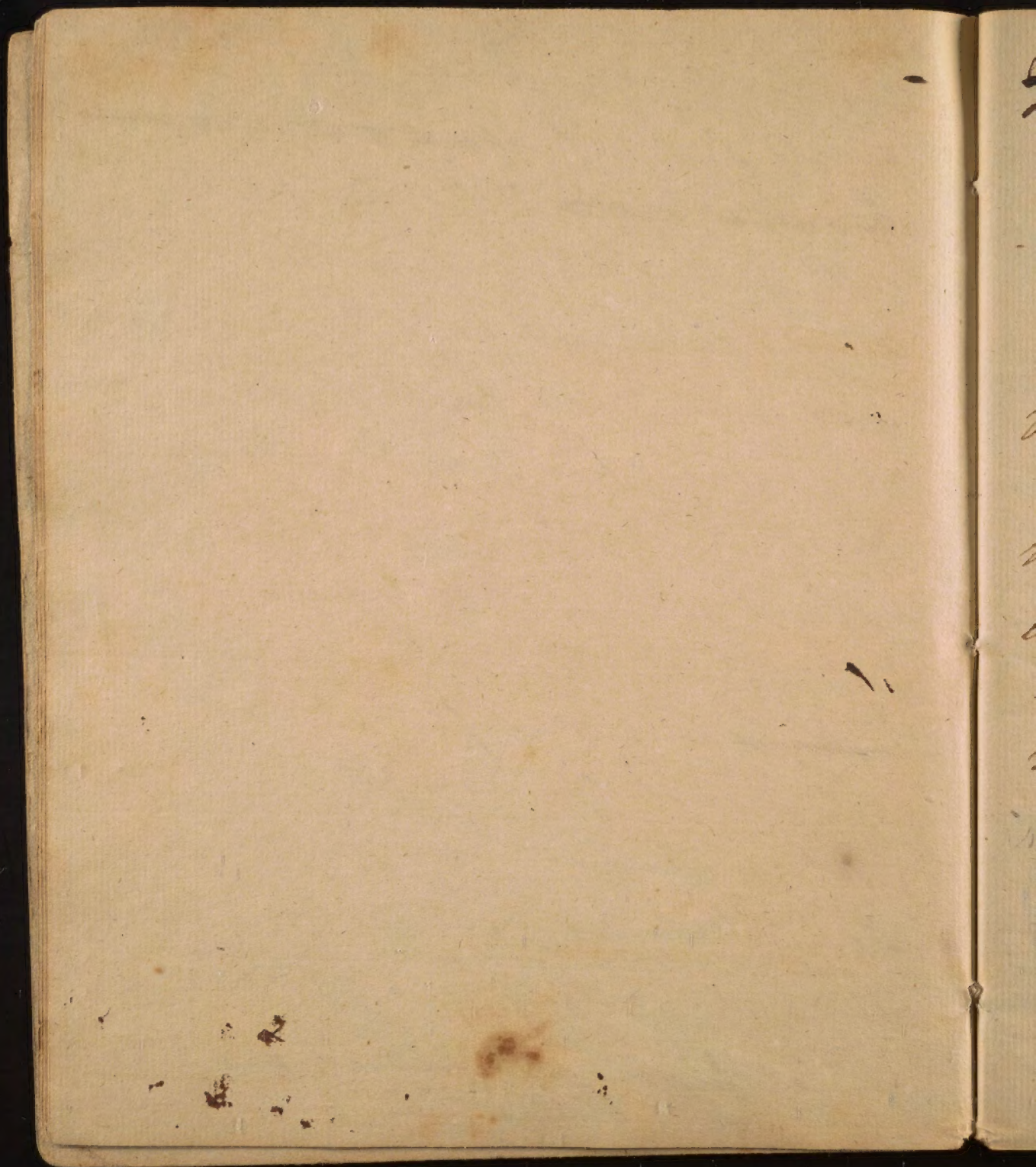


even

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the constant pulsation of the Aorta  
on the Stomach. ~~But nothing could~~  
~~be so simple~~ Dr Pitcairns's calculation  
of the force of the Stomach does not  
deserve to be contradicted, and the forces  
~~of the~~ enumerated, ~~to~~ Dr Burhaane, ~~and~~  
will appear to be very trifling from  
the history of the following exp<sup>t</sup> made  
by Spalazarani. He swallowed 25  
whole grapes - and discharged 18 of them  
in an  
~~without~~ unbroken state. He swallowed  
many whole cherries afterwards, most  
of which he discharged in the same  
sound state in which he took them.  
The triturating force of the stomach  
must be small indeed not to







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~~have~~ destroyed the texture of those tender  
fruits. We proceed next to inquire into  
the chemical Agents which have been  
supposed to be employed in Digestion.

~~Which~~ I reject putrefaction altogether  
from having any agency in Digestion.  
On the contrary - the putrefaction of  
the Aliment unfits it so much for  
being converted into Chyle - that when  
Aliment which partakes of a putrid  
Nature is received into the stomach, it  
always sweetens by the Action of the  
Gastric juice upon it. —

The ~~rest of the~~ <sup>Other</sup> agents which are  
concerned in Digestion, I suppose  
to be, Heat & Solution. ~~It is to be mentioned~~  
hereafter.



E. r. : of alq. r. s

Spallanzani has determined this  
by an accurate exp<sup>t</sup> - he exposed a  
cubet with some flesh to a heat =  
to  $\frac{1}{4}$  of  $\frac{1}{4}$  human body - & the same  
quantity to a heat of the common  
air which was probably 20<sup>th</sup> degrees  
below it. The first putrefied in 12 hours -  
the last - in 2 or 3 days.

Mr Hunter found that the digestion  
of a frog which went on at 65 60<sup>th</sup> was  
effectually checked ~~when it fell~~  
to 35<sup>th</sup> or 40<sup>th</sup>. ~~It is from the influence~~  
<sup>in part</sup> of heat that digestion goes forward  
more rapidly in warm blooded, than  
cold so animals. Eg Dog. & viper



Heat is essential to digestion. The polypus employs 2 or 3 days in winter in digesting that food which it digests in 12 hours in summer. ~~no solution~~ ~~with solution~~

~~no solution~~ can take place <sup>the</sup> without it. The gastric juice which is the principal solvent of the aliment in the stomach <sup>no more</sup> ~~discovered~~ dissolving power ~~at~~ in a heat of  $44^{\circ}$  or even  $48^{\circ}$  than common water. It is more active in a heat of  $79^{\circ}$  but its dissolving power is greatest at  $112^{\circ}$ . ✓

Heat is likewise essential to fermentation, and no degree is more favorable to an active and perfect fermentation than the heat of the human body. ✓



✓ The dissolving power of the saliva has 123  
been established by ~~many~~ <sup>many</sup> experiments. ~~7/4/4~~

~~one~~ of it are secreted in the course of

24 hours. It serves the further <sup>purpose</sup> it is

supposed of absorbing ~~Oxygen~~ <sup>oxygen</sup> which

it conveys into the body. It has

neither taste, nor smell, and hence

~~it~~ it never impairs in its healthy

state either ~~the~~ of the powers of taste or

smell.



Solution is likewise essential to digestion. The liquors which dissolve the food, are the Saliva, & the Gastric juice.

To decide the dispute between ~~Dr. Haller~~ ~~Dr. Haller~~ & ~~Dr. Haller~~ ~~Dr. Haller~~, I am one of whom asserts that it is ~~the~~ ~~the~~ other ~~chests~~ ~~of~~ The Gastric Juice is the most active of these liquors. It was not the honor of Spallanzani to have discovered that the Gastric Juice possessed a strong dissolving power over animal & vegetable substances by his experiments.

The same doctrine was established by <sup>before the time of Spallanzani</sup> Dr. Haller ~~many~~ ~~years~~ ~~ago~~. This gastric juice acts more or less in all animals, but more in some of







them than others. — These Animals  
 which have gizzards stand in the least  
 need of it — for they divide the food in  
 such a powerful manner that it after-  
 wards requires but little solution in  
 the stomach. Its dissolving power is  
 very great in the human stomach, hence  
 we find cartilages — tendons & even  
 bones are dissolved by it as well as  
 common flesh. — It is probably more  
 abundant and more active in Children  
 & in old people than in ~~the~~ middle  
 age, in order to supply the defect of  
 mastication from the want of teeth.  
 It acts most speedily <sup>I have said</sup> <sup>all</sup> upon food that  
 is well masticated, and upon flesh



V The presence of nervous influence is indispensably necessary to Digestion.

By cutting, or tying the 8<sup>th</sup> pair of nerves, digestion was destroyed in a wolf & a dog, inasmuch that the contents of the stomach Dr Haller says become putrid soon afterwards.



which is perfectly done or well cooked.  
 This has fully demonstrated by the exp<sup>ts</sup>.  
 of D<sup>r</sup> Stevens of St Louis in his thesis  
 on digestion. —

This gastric juice has been said by  
 Ingham to dissolve the stomach after  
 death. — It is possible this is sometimes the case  
 but I am disposed to ascribe  
 what he calls a corrosion of the stomach  
~~by~~ by this liquid <sup>in some instances</sup> to a destruction of  
 substance from inflammation & mortification.  
 Such appearances are very common  
 after death in all the bowels, where  
 we are sure the gastric juice cannot  
 exert ~~its~~ corroding power. ✓

Spadanzani says he found diges-  
 tion <sup>to</sup> go forward after death, but <sup>in</sup> ~~not~~  
 a very feeble degree after the heat







of the dead animal was dissipated. -

The gastric Juice yields by a chemical analysis a large proportion of the animal Ammoniacal Salt - in which is contained the phosphoric or animal acid. Take

<sup>Stomach</sup> The ~~stomach~~ possesses a power of crushing milk, <sup>this is evident in</sup> ~~but not in the stomachs~~

of many young animals, particularly children, calves, turkeys & fowls. But

this power resides in ~~the~~ animal substances as the ~~liver~~ <sup>also</sup> ~~and~~ heart of a turkey. It ~~resides~~ <sup>is also</sup> in fish;

~~may we say it resides in the liver of the cat?~~

~~only to deprive myself~~

~~the list kind of soup,~~

~~found to reside in the~~

real pp 629-643  
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juice, or that fermentation was in a degree promoted by it. —

The Aliment being thus prepared by solution, undergoes a third change in the Stomach by means of Fermentation. I know this process to be in Digestion to be rejected from the modern Systems of Physiology — I know too that there is as much a fashion in opinions as there is in Dress. I shall however still defend fermentation as one of the causes of digestion. [Not because I have like Gil Blas written a book upon it, but because I cannot account for all the phenomena of digestion without it. Such of you Gent: who know





how many opinions ~~which~~ I have which  
 I once believed and taught - I have reje-  
 -cted in the course of the last <sup>10 or 15</sup> ~~25~~ years  
 will not accuse me of obstinacy upon  
 this subject. — My weakness in the  
 republic of medicine is of a very ~~de~~  
 opposite nature. ~~I am accused of a~~ It consists in a dispo-  
~~sition to change some of~~ sition to change ~~some of~~  
~~dispositions changed~~ <sup>changing</sup> my opinions. If this  
 be a disorder in my mind, I sh. hope  
 no remedy will ever be discovered to  
 remove it - for ~~as~~ I conceive that <sup>to be willing</sup> for  
 ever to unlearn, ~~instead of learning~~  
~~is~~ <sup>is</sup> the <sup>most certain & effectual</sup> ~~only~~ way to come to a  
 knowledge of the truth. —

[By fermentation I mean that  
 natural process by which <sup>heterogeneous</sup> ~~homogeneous~~



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matters are rendered homogeneous, so that a new product is obtained, wholly different from the original mass from which it was formed. —

Animal & vegetable — & even fossil substances are all capable of fermentation. — It is specifically different in each of those classes of matter. <sup>when</sup> In vegetable matters, ~~undergo~~ the ~~phases~~ of fermentation, they pass <sup>a</sup> through this three stages — viz the vinous ~~the~~ <sup>an</sup> acetous & <sup>a</sup> putrefactive state. It is uncertain whether animal matters pass thro' the vinous, — tho' some facts make it probable, — but it is uncertain that they undergo the acetous ~~state~~ and putrefactive states. Dr Haller assures us





that he had distinctly perceived an acid smell <sup>of ~~fermentation~~ ~~of~~ ~~fermentation~~</sup> in meat, and Dr Thomas Smith informed me that he distinctly perceived not only an acid smell but an acid <sup>taste</sup> ~~state~~ in a piece of beef which he had kept two days in summer. —

~~Four~~ <sup>Four</sup> circumstances are necessary to favour the fermentation I have described.

1 Heat from  $72^{\circ}$  to  $112^{\circ}$  are most favourable to it.

2 moisture: Sugar tho' it affords the basis of fermentation in all vegetables, yet may be kept in a sound state for an 100 years provided it be kept free from moisture. — 3 Air.

4 Rest — This is necessary to render all the stages of fermentation regular. Motion <sup>whether immoderate</sup> ~~as~~ either prevents it altogether





or hurries it on suddenly to the acetous  
or putrefactive stages. —

The fermentation of all <sup>Substances</sup> ~~acetic~~ <sup>matter</sup>  
capable of it is quickened by certain sub-  
called ferments.

Let us now inquire how far these  
principles apply to the digestion of our  
food.

1 Our Aliment consists of such sub-  
stances as undergo the various acetous  
& putrefactive stages of fermentation  
out of the body. —

2 The heat of the Stomach is highly  
favourable to the fermentation of  
the Aliment when received into the  
Stomach. (3) Our Aliment & Saliva are  
both strongly impreg. <sup>th</sup> Air.

4 The Aliment Improves from Saliva.



and digestion is favored by it.

V Dr Hammond of Cambridge proved the Advantages of rest after eating by the following experiment. He gave two pointers a hasty meal of flesh.

One rested - the other ran two hours after eating. In the former all the food was digested - in the other - it was scarcely begun.

The state of the Air influences Digestion. The inhabi-

- tants of the ~~mountains~~ <sup>ch</sup> of Switzer-

- land digest the ~~gross~~ <sup>gross</sup> ~~stagnant~~ <sup>stagnant</sup> ~~air~~ <sup>air</sup> ~~which~~ <sup>which</sup> ~~is~~ <sup>is</sup> ~~so~~ <sup>so</sup> ~~stagnant~~ <sup>stagnant</sup> ~~and~~ <sup>and</sup> ~~gross~~ <sup>gross</sup> ~~that~~ <sup>that</sup> ~~they~~ <sup>they</sup> ~~can~~ <sup>can</sup> ~~not~~ <sup>not</sup> ~~digest~~ <sup>digest</sup> ~~them~~ <sup>them</sup> ~~upon~~ <sup>upon</sup> ~~their~~ <sup>their</sup> ~~plains~~ <sup>plains</sup>.

- not digest them upon their plains.  
return gross to p 648 V

- gastric juice - and the liquids, mixtate  
with our meals, ~~sufficient~~ all that  
degree of moisture which is amply suffi-  
-ent to promote its fermentation.

3 Digestion is always best promoted by  
moderate rest. - Motion, <sup>when greater than the ~~exercise~~ action of walking</sup> impairs it if not insured.  
After eating a hearty meal. → V

But it may be said that the rapidity  
with which digestion is conducted in  
the stomach is too great for the slow  
process of fermentation - tho' favoured by  
all the circumstances which have been  
mentioned. I should say ~~concern~~ in this  
objection ~~does~~ not ~~discuss~~ <sup>discuss</sup> two things  
which are calculated to accelerate  
it beyond its ordinary term of duration  
out of the body. These are 1<sup>st</sup> & 2<sup>nd</sup>





speedy & perfect solution in the stomach  
 by means of the gastric juice - now,  
 heterogeneous liquids, ferment much  
 sooner than heterogeneous matters of a  
 more solid nature. — Part 2<sup>ly</sup> the  
~~action of the saliva~~<sup>acts</sup> upon the food ~~as~~<sup>as</sup>  
~~under~~ a ferment and thus promotes  
 its fermentation. That the saliva is  
 a very essential ~~digestion~~ <sup>digestion</sup> liquor  
~~promotes fermentation~~ in the process  
 of digestion I infer from the waste of it.  
 1 from the quantity secreted  $\frac{3}{4}$  xij in a day 2<sup>ly</sup>.  
 being so generally attended with indigesti-  
 on. This is evident in great smokers  
 & chewers of tobacco — some years ago  
 a certain fruit gum was used as a  
 mastic by the nobility of Spain to  
 perfume their breath. It ~~was~~ produced  
 this effect, but it spread dyspepsia,





& Hypochondriasis among them. But I go  
 further, and add, that <sup>the Saliva</sup> ~~it~~ acts as a fer-  
 -ment upon the Aliment in promoting  
 digestion. This I infer not only from  
 the experiments of Dr Stahl, Boerhaave,  
 Hoffman - & Mc Bride, - but from the  
 following experiment made by my-  
 -self. I took two parcels of Mutton  
 & bread - consisting of 3ij each & put them  
 into separate Vials. To One of them  
 I added 3j of <sup>healthy</sup> Saliva - to the other half  
 an Ounce of water. I then <sup>exposed</sup> ~~placed~~ each  
 of them to the same degree of heat in  
 a box of sand in which I ~~for~~ placed a  
 thermometer so as to keep the heat  
 as nearly as possible at the tempera-  
 -ture of the human body. In five



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hours the mixture with the saliva began to ferment, - in seven it became sour & in twelve it became putrid, - while the mixture with the simple water remained unchanged for 20 hours.

I repeated this experiment a 2<sup>nd</sup> time - and with exactly the same result.

Thus far Gent. have I mentioned ~~any~~ presumptive arguments only in favor of <sup>ferment<sup>n</sup></sup> ~~digestion~~ being essential to digestion.

But I shall not leave the controversy here. To decide it beyond all possibility of contradiction, I tried the following experiments - not upon Man - Cats - Dogs - Cows - Horses For even upon Dr. Steven's Hypocrite, but



Ha

upon the ~~aliments~~ of my own stomach,  
at a time when I enjoyed the most  
perfect health.

Exp<sup>n</sup> 1

Having first taken a few grains of Salt of  $\frac{1}{2}$  in  
order to destroy any remains of an acid in my  
~~Having dined upon Beef-bread & pease~~  
~~Homish after my last meal, I~~  
~~It small small beer - there be~~

dined upon Beef-bread-pease & small  
beer. Three hours afterwards I took  
two grains of Tart. Emet. & threw  
up the contents of my stomach. They  
were acid to the taste, & imparted a  
red color to an infusion of a blue  
flower. Exp<sup>n</sup> 2

Having taken Salt of  $\frac{1}{2}$  as before, I  
dined on beef-bread & pease, & drank  
water only with them. Three hours





Afterwards I vomited. The contents of my Stomach were sour, & produced the same red color upon being mixed with a blue vegetab<sup>le</sup> infusion.

### Exp<sup>t</sup> 3.

Having dined on poultry - Cabbage - and unleavened bread, I took a Vomit <sup>at</sup> ~~three~~ the usual hour afterwards. The vomit was exactly the same as in the two preceding experiments

### Exp<sup>t</sup> 4.

Lest it should be inferred, that my Stomach <sup>was</sup> ~~fast~~ disordered - or peevish - or acid dyscrasy - I prevailed upon one of the most healthy & ~~was~~ <sup>was</sup> that young Englishman in the University of Edin<sup>burgh</sup> <sup>Dr. Penny</sup> in the year 1767 to lend me





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the aid of his stomach in pursuing my  
inquiries into this subject. He dined  
~~with me~~ on duck - beans - & drank  
small table beer with them. Thereupon  
afterwards he vomited. The ~~was~~ <sup>liquor</sup> he  
discharged was sour - & imparted a red  
color to the blue vegetable infusion.

These experiments were ~~made~~ frequently  
repeated, & ~~also~~ <sup>&</sup> sometimes varied - but al-  
ways with the same issue. —

I know that great pains have been  
taken to discredit them by a report that  
I was not in health when <sup>I made</sup> ~~took~~ them.

but this is begging the question. viz.

Göppe a German Physician who  
has lately written on digestion admits  
my <sup>being in health</sup> ~~experiments~~, but ascribes the





acid liquor which I discharged to  
~~single grain~~  
 the acid of tartar Bimetic being separated  
 from the Antimony in my stomach.  
 This <sup>operation</sup> ~~is~~ is too absurd to be contradic-  
 -ted. —

I concur with Spalanzani in all  
 he says in favor of the wonderful dissol-  
 -ving power of the Gastric Juice — but  
 solution <sup>alone</sup> will not ~~exchange~~ the nature  
 of Aliment, or produce any new com-  
 -pound — much less will can it produce  
 the same liquor from all the different  
 kinds of Aliment which are taken in  
 the Stomach. Is there a menstruum  
 in Chemistry, — that produces exactly  
 the same compound when mixed  
 with every different <sup>Salts - &</sup> metals - <sup>&</sup> earths?





I ask the question again - is there  
 any analogy to the gastric juice in  
 all nature - if we allow it to possess <sup>not</sup> ~~but~~  
 only a dissolving - but an assimilating  
 power - over the most heterogeneous  
 substances with which it is obliged to  
 unite in the stomach. <sup>I answer there is not.</sup> I beg pardon  
 Gent. for this challenge - I now rec-  
 =lect one - and but one analogy to it -  
 It is found, not in the book of Nature,  
 but in ancient fable - it is the <sup>hand</sup> staff  
 of Midas which turned every thing  
 it touched into Gold - And it differed only in per-  
 -forming this change more suddenly,  
 than the gastric juice converts our  
 Aliment into Chyle.

I think it probable that the



✓ I conceive this Aoid to be formed  
unusually, and to serve very im-  
portant purposes in the Animal  
Economy. —

+ In explaining  
~~for explanation~~ particular functions  
it is necessary to keep any eye upon all  
principles <sup>wh</sup> go forward ~~whole~~ in every part of the body,  
~~the functions of the body~~ — Otherwise we  
shall make as great mistakes as Physi-  
cologists, as those Physicians make who  
prescribe for Symptoms only in a disease  
without regarding the state of the whole system.

Digestion in a healthy State always  
 ceases as soon as an acid is evolved  
 from the Aliment. <sup>The</sup> ~~This~~ acid <sup>which</sup> ~~is~~  
 we find in the Animal Salt, and  
 afterwards becomes a basis of phos-  
 phorus - ~~the acid over~~ <sup>appears to be formed</sup> from it.  
<sup>Absence of this acid</sup>  
 [acid] It is the ~~fundamental~~ <sup>probably</sup>  
 which produces the fermy, & its pseudo-  
 -virulence which forms the nucleus  
 of the stone. It exists in a material  
 only - and not in a formal State  
 After it leaves the stomach, - for it is  
<sup>covered</sup>  
~~covered~~ after it is changed into Chyle  
 so as to not to be <sup>discovered</sup> ~~perceptible~~ by  
 the common tests of acids. <sup>Discovered</sup>

Thus have I delivered my opinion  
 upon the subject of digestion - nor shall  
 I yield it to Galanusani - Stevens -



V In ~~more~~ detailing the facts & exp<sup>ts</sup> in  
favor of fermentation taking place in  
the stomach, I have not availed myself  
of the least aid, from the air & acid humor  
which are often discharged from the  
stomach in digestion: for I consider them  
when ~~orbid~~ phenomena, to be  
explained ~~after~~, when they depending  
upon a relaxation of the stomach, and  
an excess in the fermentative process.

on Goffe ~~but~~ untill they have taken  
 as many pukes as I have done, to  
 establish the hypotheses they have  
 given to the world. ~~7~~

✓ There is but one Exp<sup>t</sup> wanting  
 to ~~establish~~ <sup>render establish</sup> ~~the~~ my theory - & i.e. to ex-  
 -amine by distillation whether the Con-  
 -tents of the Stomach will yield by distil-  
 -lation a virous spirit. — If they should,  
 it would place fermentation in the  
 stomach as <sup>one of</sup> the causes of digestion be-  
 -yond all possibility of being doubted.]

~~#~~ I shall now add a few observations  
 upon the phenomena ~~of~~ which go for-  
 -ward in digestion. —

1 There is after every full meal  
 a slight fever. It is sometimes ushered



Dr. Brown's exp<sup>ts</sup> which  
 undesignant<sup>ly</sup> highly  
 probable. He died in 1802  
 with yellow fever before  
 he had completed his  
 exp<sup>ts</sup>.



A Dog was killed his body opened and a thread tied round the Duodenum just below the pylorus, the duodenum and Oesophagus were then cut off & the stomach immediately taken out & nearly all the gastric juice poured out, it was then filled with Dough made of wheat flour & water & covered over in warm sand, (in which Fahrenheit's Thermometer stood at  $96^{\circ}$ ) with the divided end of the Oesophagus just above the surface of the sand, in this situation any change which might take place in the Dough would be easily observed, a piece of Dough was moistened with water & covered in the sand by the side of the stomach, by way of comparison - in two hours & three quarters a very active fermentation was observed in the stomach - the Dough worked up & ran out of the Oesophagus - no change in the Dough in the sand

#### Experiment 2

A Cat was next killed & the stomach taken out as quick as possible to prevent it from cooking - the thread & other precautions to save the gastric juice was neglected & the stomach immediately covered in the sand - & a lump of Dough about the size of a walnut put in the stomach & the same quantity put in a vial containing a small quantity of water - in one hour & twenty minutes there was a considerable motion in the stomach & the Dough worked up three fourths of an inch above the end of the Oesophagus - no change in the Dough in the phial

#### Experiment 3

Another Cat was killed & the stomach taken out this stomach contained a large quantity, a table spoon full of the gastric juice about ~~two~~ thirds of which was poured out into a phial - equal parts of Dough was put into the stomach & phial - the phial was used by way of comparison - in one hour & twenty <sup>five</sup> minutes the Dough in the stomach shew signs of fermentation the working increased & in 4 hours the fermentation was so considerable as to force  $2\frac{1}{2}$  of the Dough out of the stomach - it was compared by a bystander to the working of a barrel of Cyder - the motion continued untill 6 hours at which time the sand was suffered to cool - not the least signs of change or motion appeared in the Dough in the phial





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in with a slight degree of shivering,  
and in weakly people it is often termi-  
-nated with a gentle sweat. This fever  
is occasioned by the stimulus of ~~food~~ <sup>the</sup>  
meal being overproportioned to the  
excitability of the system produced by  
hunger. — It is not necessarily con-  
-nected with eating — nor is it perceiv-  
-ed after a slender meal. The know-  
-ledge of however of the existence of this  
fever, may be applied to several useful  
purposes. — It should lead us to recom-  
-mend a plentiful meal to all persons  
who are about to be exposed to the  
cold in <sup>a situation in</sup> ~~exposed state~~ which they  
cannot use <sup>much</sup> exercise. In a small



✓ For the time is not yet come when  
philosophy can afford either war, or  
government.

pamphlet which I published during  
 my attendance on the military hospitals  
~~for~~ entitled "Directions for the preserving  
 the health of soldiers" I recommended  
 in strong ~~for~~ terms that a soldier  
 should never do the duty of a Centinel  
 in cold weather, but after a <sup>hearty</sup>  
 meal. But I am sorry to say that this advice  
~~has not been generally followed~~

2 There is frequently a disposition to  
 sleep after a full meal. This is owing  
 to the stimulus of the food producing  
 depression in the brain <sup>fulnes &</sup> coma, on the  
~~of the food~~ <sup>healthy after the</sup> ~~tendency~~ <sup>the</sup> ~~tending to the sleep~~  
 It is most commonly removed  
 by the additional stimulus of ~~food~~  
 tobacco in the form of snuff, or  
 Sarsaparilla or by a few glasses of wine.





This sleepiness is not necessarily connected with eating. It never ensued a moderate meal. Lewis Cornaro tells us that after he adopted ~~his~~ <sup>the</sup> new & temperate mode of living <sup>wh.</sup> ~~he~~ restored his health, & prolonged his life to the most extreme old age, he found no disposition to sleep after eating.

3 The mental faculties are generally affected by a full meal. But this likewise does not follow a temperate repast. Lewis Cornaro used to <sup>exchange</sup> ~~his~~ <sup>knife & fork</sup> ~~his~~ <sup>for</sup> a book, or his pen & ink, & never found any inconvenience from it after he began to live a life conformable



6  
V. The food generally lies from 1 to 7 hours  
in the stomach according as it is more or less  
~~easy~~ easy of digestion. <sup>time is from 3 to</sup> Its median <sup>is</sup> five  
hours <sup>as it is animal or vegetable.</sup> ~~and~~ shall hereafter mention  
instances of ~~indigestion~~ substances lying  
days - weeks - months & even years in the  
stomach without being digested. p. 649 =)

to reason & nature. —

4 There is generally a disposition to ~~rest~~ <sup>rest</sup> after a plentiful meal, ~~rest~~

Dr Hammon of Cambridge proved the <sup>in favoring digestion</sup> Advantages of rest by the following experiment. He gave two pointers a hearty meal of flesh. One rested; — the other ran two hours after eating. He then killed them both. In the former all the food was digested; in the latter it was scarcely begun.

5 The State of the Air influences digestion. The inhabitants of Switzerland digest Aliments upon their mountains which they cannot digest in their Valleys, nor upon their plains. ✓

mar & our presence for a chronic





disease, without enjoying my patients  
 to make six or seven small meals,  
 instead of two or three large ones in  
 a day. There are many instances  
 of apoplexy & palsies following full  
 meals in persons of delicate health,  
 and some of sudden death from the  
 same cause. I have said

= 17 The passions have a great influence  
 upon the digestion of the food. It is invi-  
 =gorated by cheerfulness & joy - hence we feel  
 least inconvenience from full meals  
 which are followed by cheerful con-  
 =versation. ~~The passions have a great influence~~  
 It is retarded by grief - fear - and  
 shame - The passions seem to act  
 only upon the muscular fibres of



✓ Is there <sup>not</sup> a preternatural affinity  
of the Electric fluid of the nerves  
to the stomach which accelerates  
the fermentative process, & thus im=  
pairs the digestion? It seems probable  
from an exp<sup>t</sup> related by Dr Johnson.  
If the 8<sup>th</sup> pair of nerves which goes to  
the stomach be divided, digestion is  
immediately interrupted, & the food  
putrifies on the nature of feces in the  
stomach.

✓ you found if you will perceive a  
great. I have ~~observed~~ rejected ferment<sup>n</sup>  
from being one of the causes of the

of the Stomach. In the former case the Stomach is assisted in propelling the Aliment After it is digested into the Pylosus; - in this <sup>latter</sup> case, the debility of the Stomach induced by the relaxing Isapions prevents its acting with its usual force in throwing the food out of the Stomach.

The Aliment ~~after~~ <sup>when</sup> it is digested is called Chyme. After it passes into the Duodenum it is mixed with the bile. The cystic bile is said to ~~precipitate~~ <sup>precipitates</sup> its fecal parts from it, and imparts to them its peculiar Color. It is now called Chyle.

I have thus mentioned the means by which Chyle is formed by the Stomach, but it requires the aid of another viscus to render it fit for



V off, certain excrementious matters

from the blood. <sup>In answer to the ~~first~~ <sup>first of these</sup> opinion,</sup>  
I shall only say the <sup>in</sup> nature and in answer to  
the second, I shall <sup>now</sup> lay before you  
~~some facts intended to prove that the liver sends a~~  
<sup>much higher</sup> purpose than to discharge ~~any~~  
~~any~~ thing of a fecal nature

from the blood. go to account of the  
liver p: 16.

composing perfect animal nourish-  
-ment. This viscus I believe to be the  
Liver. The common opinion of the  
Office of this large & noble viscus is  
that it is intended ~~for~~ to furnish  
a fluid which by mixing with the  
~~food~~ Chyme that descends from the  
Stomach forms the Chyle. The Chyme  
was supposed to be of an Acid na-  
-ture, and this Acidity was said to  
be destroyed by the bitterness of the bile.  
This opinion was founded upon some  
experiments made by D Ramsay of  
Edin<sup>2</sup> and was taught by D Cullen.  
2 The Liver was supposed by some  
Physiologists to be a large excretory  
viscus intended to separate & throw ✓





of the Lymphatics or Absorbing System.

Upon this Subject you are not to expect a minute detail of all the Opinions & controversies which ~~have been~~ are to be found in books. ~~Such a detail would be~~ <sup>such a detail would be</sup> as useless, as it would be tedious. I shall select only such facts ~~as are~~ as appear to be true, and deduct ~~such~~ <sup>from them</sup> principles only, as ~~we~~ admit of being applied to pathology & the practice of Physic. —

By the Absorbing System is meant the Lactial as well as Lymphatic vessels. They are alike in so many particulars <sup>that</sup> they have been designated by one name. They both open into cavities of the body — they have the same structure. ~~they~~ <sup>in both</sup> pass this ~~is~~ Glands in some cases,



We return to pursue the Chyle which when  
formed by the stomach and liver ~~is~~ <sup>in the manner that has</sup>  
been described is conveyed  
~~by~~ <sup>through</sup> certain vessels distributed plentifully  
~~through~~ the small, and sparingly thro  
the large guts called Lacteals from the  
milky color of the Chyle ~~they~~ which  
pass through them. These Lacteals  
have been supposed to perform the office  
of Absorbents by some Physiologists, while  
Others suppose they perform the office of se-  
cretory vessels, and that <sup>they induce</sup> ~~they induce~~ by their  
action a change upon the Chyle analogous  
to that which a gland imparts to the





fluids which enter into them. The Chyle  
 whether admitted into the Lacteals by ab-  
 -sorption or secretion is conveyed by them  
~~thru the~~ <sup>thru the</sup> ~~into~~ mesentery into a large Canal called  
 the Thoracic Duct which runs along the  
 vertebral, and is poured from it into the left  
 subclavian Vein in which it is mixed  
 with the blood, and conveyed to the heart.  
 By what process it acquires all the properties  
 of blood ~~is not yet~~ remains yet to be  
 explained. Dr. Hutton has thrown some  
 light upon this mysterious subject in his  
 ingenious inaugural dissertation. He has  
 discovered by many experiments that the  
 Chyle is coagulable in the Thoracic Duct,  
 and after it enters the Arteries, but that





it parts off its coagulating ~~power~~ <sup>quality in</sup> the  
 veins. From this you see it assumes  
 one of the properties of the blood in the  
 thoracic duct, and in the Arteries; but it  
~~is~~ <sup>is</sup> deficient in others. It shows  
 no ——— marks of what is called  
 ——— vitality, or ~~what~~ <sup>what</sup> I have  
 called animation of the coagulable  
 lymph of the blood, when subjected to gal-  
 vanic influence. The Doctor supposes  
 further, that the blood like the bones  
 and muscles possesses a power of cover-  
 =ing the matters which are brought  
 into contact with it into its own na-  
ture, and hence he says the cause of

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Main body of handwritten text, appearing to be a list or series of entries, though the script is very faint and difficult to decipher.



Angerification.

The faeces when precipitated from the  
 Chyle pass slowly into the large guts.  
 These are capacious, in order to  
~~prevent the~~ ~~expulsion of~~ ~~the~~  
~~faeces~~ ~~insurmounting~~ of our frequently  
 discharging them. In old age they  
 stagnate for many days without  
 much injury to the system: on the  
 contrary, they probably perform the  
 offices of those Stimuli which have  
<sup>to</sup> ceased act, or have become feeble in  
 old people, and thus help to keep up  
 the actions and machinery of life.  
 The stagnation of the faeces in ~~the~~

V The Intestines of Carnivorous  
animals are much shorter in  
proportion to the length of their bodies  
than in granivorous ~~or~~ <sup>animals.</sup>

~~For example the Digestion of food in~~  
~~the former is the former & as of~~  
~~the latter~~ and for obvious reasons. Vegetables  
afford their nourishment more slowly  
& ~~with~~ with more difficulty than  
animal matters, hence they require  
more mastication - longer digestion from  
one or more stomachs & a longer  
course of lactals to absorb the chyle  
formed by vegetable food.



the bowels of old people <sup>5</sup> seems to be ~~probably~~ in the  
Colon, and hence the reason probably  
why the wind discharged by them is  
less offensive & than in persons in  
whom the feces are constantly lodged in  
the Rectum. ✓

We proceed next in order to speak  
of that fluid which is formed from  
the Chyle, and that is Blood. . . .

~~40 to p. 559-7~~











20  
seldom <sup>is</sup> offensive, as it is in childhood & middle  
life.

we should proceed next in order to  
you will perceive that I have taken  
no notice of the office of the Liver. It

treat of the <sup>blood</sup> ~~lymphatics~~, but before we take  
leave of the ~~contents~~ of the functions of the

viscera, there remains one, upon the

use of which Physiologists have been divided  
or silent since the ~~freedom~~ birth of our species.  
~~I shall~~ I mean the Spleen. I shall attempt to explain  
its use by ~~describing~~ <sup>describing</sup> ~~as a suppressant upon it, since~~  
V some of the Lymphatics do get in  
it has been supposed prior

these contents into the Thoracic Duct, but

Dr Brown ~~has~~ believes that this is the case  
enter the blood vessels in other places. This

from the following experiment.  
has been proved by ~~Dr Brown~~ by a ~~series~~ of

expts. - he ~~cut~~ up the thoracic duct in several

various animals, and ~~put~~ them up upon madder

ch. he found tinged ~~the~~ bones. It has been  
Several other facts ~~showing~~ <sup>opposing</sup> ~~a fact~~ related by

his ~~costa~~ ~~disproved~~ by ~~a~~ ~~series~~ of ~~expts.~~

Mr Richardson ~~has~~ applied a small quantity  
of Iodine to the <sup>left</sup> ~~right~~ of a young man.

Soon afterwards he observed the salivary  
glands ~~swell~~. One half the ~~glands~~ <sup>salivary</sup> on



both have  
 & pass by them in others & they ~~differs~~ <sup>chiefly</sup> fluids  
 valves. They differ in conveying ~~of~~  
 of a different quality to the thoracic duct.

① Having ~~mentioned~~ <sup>uses of</sup> the lacteals formerly,  
 it remains only to speak of the lymphatics  
~~which are the only vessels of the system~~  
~~the lymphatic system. I shall make~~  
~~some remarks on the lymphatic system.~~  
 They are a system of  
 small vessels originating ~~from the~~  
~~all the~~ <sup>all the</sup> cavities of the  
 body, and frequently anastomosing, - enlarging  
 and contracting  
 thro' a series of glands called conglobate  
 & then  
 discharge their contents into the ~~lacteal~~  
 thoracic duct, which empties them into  
 the ~~system~~ mass of blood in the manner  
 formerly mentioned.

The following circumstances deserve  
 attention with respect to these vessels.

1 They appear to possess coats analogous



left side to be affected by it. The right side of  
the mouth & tongue were wholly unaffected  
by the ~~§~~ These facts are important, as they  
show that certain medicines may be introduced &  
moreover

✓ The fibres of these coats, possess great  
irritability, - inasmuch that according  
to Dr Waller ~~but~~ they disappear altogether  
when they are stimulated, ~~and~~ even tho'  
they be filled with their natural, or <sup>the</sup> w.  
any artificial liquor.

& into the system without mixing <sup>with</sup>  
the blood, or entering the great circulation.  
~~It is this the lymphatics only that~~  
liquids pass to the kidneys from the stomach,  
and hence the <sup>rapidity</sup> of their passage. &  
Direct communication is not necessary  
for that purpose.

† In the course of this year 1808 I attended  
a young Gent.<sup>l</sup> who had laboured himself  
for the disease. The ~~German~~ Spitting &

to the coats of the blood vessels, One of which  
 is ~~is said to be~~ <sup>evidently</sup> muscular. This appears  
 from this alternate dilatation & contraction,  
 and <sup>is</sup> from this being liable to pain -

& swelling & inflammation. These coats are  
 much stronger in proportion to their size than the  
 coats of the blood vessels. ✓

They are all endowed with Valves placed  
 in some cases at a small, in others at  
 a large distance from each other, which  
 prevent the reflux of the lymph, in the  
 same manner <sup>that</sup> the Valves in the Veins  
 prevent the reflux of the blood.

They are all endowed, not only with  
 veins, but with Arteries & Vessels in which  
 the circulation is carried on with the  
 same regularity in the largest vessels of  
 the body.

It has <sup>the mouths of</sup> ~~with certain~~  
 been supposed that they <sup>are</sup> all endowed with  
 animals.



~~Of course were on one side of his mouth only - and  
the sores were healed on ~~one side~~ that side only of  
his penis by the application of  $\frac{1}{2}$  to  $\frac{1}{4}$  grain. #  
+ matters until they have first been dissolved  
by a liquor ~~first~~ secreted by the Anterior.~~

# In Dec<sup>r</sup> 1811 I ~~attended~~ <sup>visited in consultation</sup> a gentleman from  
Newbury, Judge Bergen in a palsy, ~~who~~ <sup>who</sup> had been  
salivated by his physician, ~~and in the family~~ <sup>and in the family</sup> affected the  
paralytic side of his mouth only. I shall on  
~~decide presently to give a different explanation  
of these facts in our pathology. - A~~

V6 They are said to possess a retrograde power  
- by which we mean their contents are  
propelled in a contrary direction to that  
which is natural. ~~see page 100~~ Dr. Darwin  
Jun<sup>r</sup> ~~has~~ <sup>retrograde</sup> furnished many facts in favor  
of this motion in these vessels. & his father  
has explained many of the phenomena  
of diseases from it. see this work.

~~I have previously mentioned~~ <sup>mentioned</sup> and has lately  
mentioned a fact which shows that the  
lymphatics ~~as~~ convey matters to remote  
parts of the body, without without

an opening which has been called a mouth with which they not only absorb liquids, but feed as it were upon solid matters - such as ~~the~~ blood - flesh, & even bone. What makes it <sup>still more</sup> probable: <sup>something like</sup> they possess mouths, is that they have been demonstrated in several fish. ~~Dr~~ Moore & exposes the lymphatics do not absorb these.

5 The Lymphatic glands appear firm, filling them with  $\frac{1}{2}$  to be cellular, but Dr Moore has demonstrated that they are ~~composed~~ <sup>composed</sup> of convoluted vessels. Mr Henson however thinks he discovered, a cellular structure in some of the smallest glands. It is certain that the blood vessels - nerves & the small cells of the smallest glands are connected together by cellular membrane.

Having delivered these general observations, we proceed next to inquire in what manner the Lymph which is carried



A Upon Dr. Brown's exp<sup>t</sup> of the facts I have related I shall  
~~In the mean while I shall only remark~~ <sup>colouring matter of the</sup>  
 that ~~Mr. Thomas~~ I believe that the <sup>penetrated</sup> madder passed  
 thro the solids of the body, and matter of the  
 humors as it does of the ~~the~~ in Dr. Brown's  
 exp<sup>t</sup> and thus found its way into the general  
 circulation by which it was conveyed to the  
 bones. The same thing probably took place in  
 the exp<sup>t</sup> of Mr. Thomas upon a rabbit in  
 which he tied up the <sup>just before it entered at</sup> thoracic duct, at the  
 junction between the left left jugular  
 & subclavian Veins, and afterwards gave  
 injected  $\frac{1}{2}$  of strong Infusion of Rhubarb,  
 in  $\frac{3}{4}$  of an hour, the Urine was voided,  
 & the presence of Rhubarb <sup>was</sup> detected in it  
 by the addition of potash to it. It passed  
 into the gall bladder in Mr. Thomas 2<sup>nd</sup>  
~~the~~ ~~off~~ <sup>out</sup> experiment in a dog in the same way.  
 That the effects nothing can be

inferred in favor of Dr. Mearns's opinion  
from its affecting but ~~not~~ the Lymphatic

~~the comes from~~ ~~any~~ ~~can~~ ~~are~~ ~~secret~~ ~~in~~ ~~forming~~  
Glands of One side only. I hope in our pa-  
-thology to give a more satisfactory <sup>explanat</sup> ~~position~~  
of these facts. I w<sup>d</sup> only remark further,  
~~you notice that I send to you a copy~~ ~~in~~ ~~form~~

that I do not think that we require a passage  
from the stomach to the kidneys to account  
from the <sup>sudden</sup> rapid increase of Urine after the  
stomach has been <sup>an</sup> overcharged with  
watery liquors. It may be explained  
upon another principle to be mentioned  
hereafter.



the intervention of the Rosacic duct. By  
applying Gal Instrument to the <sup>left</sup> leg, <sup>of the</sup> ~~external~~ <sup>glands</sup>  
young man, he affected the ~~salivary~~ <sup>of</sup>  
of the left side only, and one half the  
left side of the ~~tongue~~ <sup>of</sup> ~~it~~ with those Aphthous sores  
which attend a salivation - the right  
side was wholly unaffected with the G.

by these ~~lymphatic~~ vessels to the heart is found  
 in the different cavities of the body. Formerly  
 it was supposed to be an exudation  
 from the extremities of the Arteries,  
 but Mr Brown has made it probable  
 that it is a secreted liquor. This he endeavours  
 to establish 1. by proving that the  
 Lymph is of a coagulable nature, &  
 that it partakes of most of the properties  
 of the coagulable <sup>ling</sup> Lymph of the blood. This  
 coagulable quality belongs equally to the  
 fluid which is found in the <sup>lymphatic</sup> vessels  
 with that which is found in the cavities  
 of the body. 2 He infers it from the  
 diseases to which this fluid is liable,  
 all which he ascribes to the disordered  
 state of the ~~extremities of the~~ vessels  
 which secrete it. & 3. In a Dropsy the





Lymph is less coagulable than in health.  
 This he ascribes to a relaxation in the  
 secretory vessels. ~~And~~ Again. we sometimes  
 find ~~the~~ <sup>certain internal</sup> surfaces <sup>Trachea</sup> as the pleura - Pericard.  
 - dium & even the ~~interior~~ <sup>inside</sup> of the  
 heart covered with a crust which resembles  
 the size or buffy coat of the blood. This  
 Mr. Henson supposes to be produced by  
 too much tone or action in the <sup>vessels</sup> ~~arteries~~  
 which secrete the lymph - & lastly - he  
 supposes this to be nothing but the product  
 of a certain degree of inflammation  
 in these vessels. - This opinion concern-  
 -ing this was first suggested by <sup>my predecessor in</sup> Dr  
 Morgan, <sup>in this Chair</sup> and it is now I find ~~many~~  
~~many~~ <sup>many</sup> adopted by Physiological writers.

In what manner is the lymph  
 when secreted taken up by the lymphatics?





It has commonly been supposed by means of capillary attraction - hence their name of Absorbents - but I would rather suppose that it is by the effect of muscular contraction excited by the specific stimulus of the lymph <sup>or matter taken up,</sup> upon the mouths of the Lymphatics. —

In what manner is the lymph when it enters the Lymphatics conveyed to the ~~and throughout the body?~~ <sup>thoracic duct?</sup> I answer - 1 by the pulsation of adjoining Arteries - 2 by the pressure of contiguous muscles - and 3 by the stimulus of the lymph acting specifically & mechanically upon the lymphatic vessels in every part of their course.

Are Lymphatic vessels found in every part of the body? I answer in every part except the head, and there



V 3<sup>ly</sup> From the cures which have been  
made of the Hydrocephalus internus,  
which disquisitions prove to arise from  
an effusion of water in the Ventricles  
of the brain. —

existence there is presumed, <sup>1</sup> from the  
- circumstances.

Analogy in certain fishes ~~is~~ particularly  
the Skate in whose head De Monroe dis-

- covered them many years ago 2<sup>d</sup> From  
the history of a  
~~benign~~ disease related by Mr. Benson.

~~The~~ A man was affected with a right  
palsy of his left arm - ~~and~~ <sup>with</sup> a hesitation  
in ~~his~~ voice & a trembling of his lips. These  
symptoms were supposed to arise from  
some compression in the brain. A swell-  
- ing in a lymphatic gland in the left  
side of the neck which finally suppurated,  
~~the~~ <sup>it</sup> removed all his complaints. Probably  
by the translocation of ~~an effusion from~~  
<sup>an effusion from</sup>  
<sup>or cephalic</sup>  
an internal to an external gland,  
<sup>by</sup> It is presumed from the ~~certainly~~  
that the veins in no part of the body





absorb lymph. This has been proved  
by many experiments made by Monro  
& Hunter.

I have said that the lymphatics ab-  
sorb solid as well as fluid bodies. This is  
evident from many facts. The ~~destruction~~ destruc-  
-tion or annihilation of the Thyroid  
gland can be accounted for in no other  
way. The greater levity of the bones of old  
than <sup>of</sup> young men, - the absorption of the  
color imparted to the bones by madder, -  
- the perianatural softness of the bones  
in certain diseases, - & the detection of  
bony matter in the Urine, all prove  
that the lymphatics possess a power over  
solid matters. - To these we may add the  
occasional disappearance of schirrous



✓ It would seem from this fact, that  
the Arteries & Lymphatics perform  
opposite offices in the System. The  
business of the one, is to repair - of the  
Other, to destroy different parts of the <sup>body</sup> ~~system~~.  
- of the one to secrete <sup>& effuse</sup> ~~or effuse~~ a fluid,  
& of the Other, to absorb it & mix it again  
with the blood from which it was secreted.  
Health <sup>seems to</sup> consist in this strife between the  
Sanguiferous & Lymphatic Systems, and  
no sooner <sup>does an ascorbic take</sup> ~~as they are separated~~  
<sup>place between them</sup> ~~than we behold~~ - than we  
behold ~~as~~ Dropsy - Diabetes - Rickeys - and  
Scrophula - of <sup>the</sup> more hereafter.



tumors & wens in every part of the  
 body. They <sup>appear to be</sup> ~~are~~ removed only in  
 consequence of the action of the lymphatics  
 upon them.

Mr Hunter has remarked that in infancy  
 the cavity of the thigh bone is remarkably  
 small. As the child advances in age, this  
 cavity becomes larger - Thus while the  
 Arteries add bony matter to the external,  
 the lymphatics ~~absorb~~ consume & absorb  
 the internal part of the ~~bony~~ bone. In  
 this manner - it is probable the <sup>solids</sup> ~~bony~~  
<sup>are</sup> constantly undergoing a renovation  
 in a greater or less degree, more espec-  
 ially in the early part of life. ✓

[But we have not yet done with  
 the offices of the lymphatics. They



~~the Lymphatics absorb~~  
I have said ~~absorption takes place~~  
from internal parts of the body, but  
it has long been ~~believed~~ that they  
absorb likewise from the surface of the  
body, and ~~was a general~~ system of  
many practical inductions in  
pathology and the practice of physic  
have been made from it. =



